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ABSTRACT

Seven preventive health measures were studied for purposes of determining Ohio rural residents' level of participation; change in participation between 1962 and 1972; participation by farm and rural nonfarm categories; and level of participation by age, sex, educational attainment, and family size. Randomly selected from 10 of Ohio's 88 counties, the sample (2,166 families) was stratified in terms of rural farm and rural nonfarm populations (9.6% of the rural farm population in the sample counties and 1.3% of the total Ohio rural farm population and 1.5% of the rural nonfarm population in the counties and 0.16% of Ohio's total rural nonfarm population). Interviews conducted during 1972 with 4,662 rural and 3,675 rural nonfarm people revealed the following: a 9% increase in physical checkups between 1967 and 1972; a greater correlation between dental care problems and age and sex than other indicators; a 1% increase (1967-72) in dental checkups with only a 56% level of participation during the past 2 years; a 22% level of participation in chest X-rays and a 28% level in tuberculin skin tests during 1972; a 57% level of participation in tetanus shots over the past 10 years; a 14% increase in measles immunizations (1967-72); positive correlations between high educational level and large family size and participation levels with lesser correlations between age, sex, and participation; greater participation levels among rural nonfarm people. (JC)

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MARCH 1975

Selected Health Practices Among Ohio's Rural Residents: A Decade of Findings

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Selected Health Practices Among Ohio's Rural Residents: A Decade of Findings

G. HOWARD PHILLIPS, ALBERT R. PUGH, and SHU-O YANG[1]

INTRODUCTION

"When you have your health, you have almost everything." This statement in a contemporary television commercial sums up man's increasing preoccupation with his health status.

Health can be viewed from many perspectives. One widely held position categorizes health care under the three general headings: preventive, curative, and rehabilitative. This study is concerned with preventive health care.

The major objective of this longitudinal study was to determine the use of selected preventive health practices by rural Ohioans. This interest stems from the idea that effective health care delivery systems can be developed better if the exact scope and nature of the problem are identified.

The following specific objectives were developed for the study:

- To measure the level of participation in selected health practices by Ohio's rural residents.
- To compare the level of participation in selected health practices of farm and rural nonfarm residents.
- To examine the levels of participation in selected health practices by age, sex, educational attainment, and family size.
- To determine changes in participation in selected health practices from 1962 through 1972.

Preventive Health Care

Logic dictates that preventive health care should take precedence over a curative approach. However, health educators frequently express concern over the lack of attention to preventive care: "Controlling the controllable problems and preventing the preventable one have received relatively little concerned attention. The health care system traditionally has been geared to short-term treatment of acute illness" (13).

Koos states in his classic health study of residents of Regionville: "If illness is to be prevented and health maintained, the health examination appears to have a vital role in that process" (6).

But health consumers prefer to react to symptoms rather than participate regularly in preventive medicine: "Many causes of disease and death can at least be influenced, and some prevented altogether, by good health practices by the individual. The fact is, however, that good health practices are not uniformly followed or even considered" (13).

Andersen and Anderson, in an examination of national data collected in 1953, 1958, and 1963, noted that 29% of slightly more than half the population had a physical examination as a preventive practice, 39% as a result of symptoms, and 32% because it was required (2). They also reported women and young children were more likely to have a preventive examination than men.

Avnett found young children had the highest rates of preventive services in a study of participants in a health insurance plan (3). A recent rural Missouri study found that while most respondents felt people should have a regular physical examination, most reported they did not (5).

Preventive dental behavior follows a similar pattern as that reported for physical examinations. A study of urban mothers found children of mothers with a preventive orientation in dental behavior were nine times more likely to use private dentists for preventive checkups than children of mothers who received no treatment in the past 2 years (4).

Belief in immunization to prevent diseases is widely accepted in American society. Koos (6) found about 90% of respondents had *shots*, but many were unable to state the kind of immunization they had received. Nationally, 5% of physician visits are for vaccinations (14).

A wide assortment of variables have been researched relative to their relationship to preventive health care behavior. Selected ones will be discussed as they relate to the findings of this study.

METHODOLOGICAL PROCEDURE

A stratified random sample of 10 of Ohio's 88 counties was selected. One county was randomly chosen from each of the 10 Cooperative Extension Service areas, representing various topographic and climatic conditions and types of farming. The counties selected and the boundaries of the 10 Extension areas used in the study are shown in Figure 1.

Cluster samples of 10 or fewer farm and rural nonfarm families living outside incorporated places

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FIG. 1.—Geographic distribution of sample counties.

were selected randomly in each of the 10 counties. The definition of a farm family was the same one used in the 1969 Census of Agriculture: i.e., a family living on a place operated as a unit of 10 or more acres from which annual sales of agricultural products total $50 or more. Places of less than 10 acres operated as a unit are counted if the sale of agricultural produce is $250 or more. This includes part-time farmers. A rural nonfarm family is a family living outside an incorporated area other than farm families.

Volunteer interviewers participated in a 3-hour county interviewer training meeting where each was assigned the families he or she would contact during the year. The initial interviews of selected families were made during the first 2 weeks of April 1972.

During 1972, 4,662 farm people and 3,675 rural nonfarm people living outside incorporated places were interviewed. The farm sample represented 9.6% of the farm population in the 10 sample counties and 1.3% of the total farm population in the state. The rural nonfarm population living outside incorporated places was represented by 1.5% of the rural nonfarm population in the 10 sample counties and 0.16% of the total rural nonfarm people of the state. The total farm population in the 10 sample counties represented 13.9% of Ohio's 349,729 farm residents, and the total rural nonfarm population in the 10 sample counties represented 10.3% of Ohio's 2,300,172 rural nonfarm residents.

The sample (2,166 families) population was compared to the total state rural population by age categories. The results are shown in Table 1. Percentage differences in the comparisons were exceedingly small and could have occurred by chance alone. It was concluded that the sample size was adequate to represent the rural population.

TABLE 1.—Comparison of the 2,166 Rural Families in the Sample with the 1970 Census of Rural Population in Ohio by Age Categories.

Age	Census		Sample		Difference in Percent
	Number	Percent	Number	Percent	
Under 5	228,601	8.7	580	7.0	1.7
5-14	598,735	22.8	1,961	23.6	0.8
15-24	418,236	15.9	1,543	18.6	2.7
25-44	632,290	24.1	1,849	22.3	1.8
45-64	520,906	19.8	1,755	21.2	1.4
65 and Over	230,364	8.7	604	7.3	1.4
Total	2,629,132	100.0	8,292	100.0	

FINDINGS

Physical Checkups

Physical checkups are increasingly viewed by health personnel as a highly desirable preventive health practice. Table 2 shows that the percentage of rural Ohio residents who had physical checkups in the past 2 years increased from 38% in 1967 to 47%

TABLE 2.—Number and Percent of Ohio Farm and Rural Nonfarm Residents Who Had Physical Checkups in the Past 2 Years, 1967 and 1972.

	1967		1972		Percent Change from 1967 to 1972
	Number	Percent	Number	Percent	
			FARM		
	(1)	(2)	(3)	(4)	(5)
Physical Checkup	2,563	35	2,059	45	+9
No Physical Checkup	4,700	65	2,565	55	—9
Total	7,263	100	4,624	100	—
			RURAL NONFARM		
	(6)	(7)	(8)	(9)	(10)
Physical Checkup	2,556	41	1,857	51	+10
No Physical Checkup	3,649	59	1,810	49	—10
Total	6,205	100	3,667	100	—
			TOTAL RURAL		
	(11)	(12)	(13)	(14)	(15)
Physical Checkup	5,119	38	3,916	47	+9
No Physical Checkup	8,349	62	4,375	53	—9
Total	13,468	100	8,291	100	—

X^2 for columns (1) and (6) = 49.505, d.f. = 1 $P < 0.001$.
X^2 for columns (3) and (8) = 30.639, d.f. = 1 $P < 0.001$.

in 1972. This 9% change indicates an upswing in the percentage of rural residents getting examinations, as there was only a 3% increase from 1962 to 1967 (10).

A comparison of rural farm and rural nonfarm residents is also presented in Table 2. It was pointed out in the book, *The People Left Behind*, that regardless of income, rural farm residents average fewer physician visits per person than rural nonfarm residents (12). This statement tends to be supported by the data in Table 2. Both the 1967 and 1972 studies reveal that rural nonfarm residents had a higher number of physical checkups than farm residents did. However, both groups increased at about the same percent. Perhaps part of the difference may be due to the fact that farm people are self-employed, while rural nonfarm people are more likely to be working for companies and organizations which require employees to be examined. As previously noted, Andersen and Anderson found 39% of physical examinations for the total population were required.

Age is one of the important variables predictive of the number and percentage of physical checkups. Table 3 lists the number and percent of Ohio's rural residents securing physical checkups by age groups. Both the 1967 and 1972 studies showed that children under 14 years of age had the lowest number of physical checkups within the past 2 years. This finding was expected.

Adults were expected to have physical checkups more often because of more nonvoluntary checkups required by school, job, pregnancy, military service, or insurance. Adults are also more likely to have voluntary physical checkups due to an increasing concern about their health as they grow older.

When 1967 and 1972 data are compared, all age groups increased (percentagewise) in securing physical checkups. This increase is especially noticeable among the 65 and over group (15% increase). In 1967, there was no significant difference in the percent having physical checkups for age groups 15 to 64 and 65 and over. However, there was a difference between these two groups in the 1972 study, with the 65 and over group having more physical checkups than the 15 to 64 group.

In the 1967 study, differences in the percentages of males (38) and females (38) who had a physical

TABLE 3.—Number and Percent of Ohio Rural Residents Who Had Physical Checkups in the Past 2 Years by Age Groups, 1967 and 1972.

	1967		1972		Percent Change from 1967 to 1972
	Number	Percent	Number	Percent	
	AGE 0-14				
	(1)	(2)	(3)	(4)	(5)
Physical Checkup	1,157	26	895	35	+9
No Physical Checkup	3,260	74	1,645	65	—9
Total	4,417	100	2,540	100	—
	AGE 15-64				
	(6)	(7)	(8)	(9)	(10)
Physical Checkup	3,519	44	2,668	52	+8
No Physical Checkup	4,509	56	2,479	48	—8
Total	8,028	100	5,147	100	—
	AGE 65 AND OVER				
	(11)	(12)	(13)	(14)	(15)
Physical Checkup	443	43	353	58	+15
No Physical Checkup	580	57	251	42	—15
Total	1,023	100	604	100	—
	TOTAL				
	(16)	(17)	(18)	(19)	(20)
Physical Checkup	5,119	38	3,916	47	+9
No Physical Checkup	8,349	62	4,375	53	—9
Total	13,468	100	8,291	100	—

X^2 for columns (1), (6), (11) = 389.459, d.f. = 2 $P < 0.001$.
X^2 for columns (3), (8), (13) = 221.449, d.f. = 2 $P < 0.001$.

TABLE 4.—Number and Percent of Ohio Farm and Rural Nonfarm Residents Who Had Physical Checkups in the Past 2 Years by Sex, 1972.

	Farm				Rural Nonfarm				Total			
	Males		Females		Males		Females		Males		Females	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Physical Checkup	1,016	43	1,043	46	930	51	927	50	1,946	46	1,970	48
No Physical Checkup	1,354	57	1,211	54	895	49	915	50	2,249	54	2,126	52
Total	2,370	100	2,254	100	1,825	100	1,842	100	4,195	100	4,096	100

X^2 for columns (1) and (3) = 5.331, d.f. = 1 $P < 0.05$.
X^2 for columns (5) and (7) = 0.147, d.f. = 1 $P > 0.05$.
X^2 for columns (1) and (5) = 27.132, d.f. = 1 $P < 0.001$.
X^2 for columns (3) and (7) = 8.866, d.f. = 1 $P < 0.01$.
X^2 for columns (9) and (11) = 2.371, d.f. = 1 $P > 0.05$.

checkup in the past 2 years were not significant (10). This lack of a significant difference continued for 1972, with both males (46) and females (48) increasing 8% and 10%, respectively, in this 5-year period.

Further examination of these data by farm and rural nonfarm found statistically significant differences. Table 4 shows the distribution. Farm females had more checkups than farm males. The farm females also had fewer physical checkups than either rural nonfarm males or females. The rural nonfarm males exceeded all others, with 51% reporting physical checkups.

Both the 1967 and 1972 studies support the generalization that the higher the educational attainment of the heads of households, the higher the percentage having physical checkups. In both the 1967 and 1972 data shown in Table 5, the percentages of physical checkups by heads of households increased with additional educational background. Heads of households with less than 12 years of education showed the lowest percentage increase in physical examinations from 1967 to 1972.

Table 6 shows a breakdown of farm and rural nonfarm people with physical checkups by educa-

TABLE 5.—Number and Percent of Ohio Rural Residents Who Had Physical Checkups in the Past 2 Years by Educational Levels of Heads of Households, 1967 and 1972.

	1967		1972		Percent Change from 1967 to 1972
	Number	Percent	Number	Percent	
	0-11 YEARS				
	(1)	(2)	(3)	(4)	(5)
Physical Checkup	1,842	34	1,329	42	+8
No Physical Checkup	3,553	66	1,808	58	—8
Total	5,375	100	3,137	100	—
	12 YEARS				
	(6)	(7)	(8)	(9)	(10)
Physical Checkup	2,540	38	1,960	48	+10
No Physical Checkup	4,071	62	2,120	52	—10
Total	6,611	100	4,080	100	—
	MORE THAN 12 YEARS				
	(11)	(12)	(13)	(14)	(15)
Physical Checkup	702	51	621	61	+10
No Physical Checkup	678	49	400	39	—10
Total	1,380	100	1,021	100	—
	TOTAL				
	(16)	(17)	(18)	(19)	(20)
Physical Checkup	5,084	38	3,910	47	+9
No Physical Checkup	8,282	62	4,328	53	—9
Total	13,366	100	8,238	100	—

X^2 for columns (1), (6), (11) = 45.225, d.f. = 2 $P < 0.001$.
X^2 for columns (3), (8), (13) = 106.315, d.f. = 2 $P < 0.001$.

TABLE 6.—Number and Percent of Ohio Farm and Rural Nonfarm Residents Who Had Physical Checkups in the Past 2 Years by Educational Levels of Heads of Households, 1967 and 1972.

	1967		1972		Percent Change from 1967 to 1972
	Number	Percent	Number	Percent	
	0-11 YEARS EDUCATION (FARM)				
	(1)	(2)	(3)	(4)	(5)
Physical Checkup	874	32	680	38	+6
No Physical Checkup	1,905	68	1,095	62	—6
Total	2,779	100	1,775	100	—
	0-11 YEARS EDUCATION (RURAL NONFARM)				
	(6)	(7)	(8)	(9)	(10)
Physical Checkup	968	37	649	48	+9
No Physical Checkup	1,628	63	713	52	—9
Total	2,596	100	1,362	100	—
	12 YEARS EDUCATION (FARM)				
	(11)	(12)	(13)	(14)	(15)
Physical Checkup	1,364	36	1,126	47	+11
No Physical Checkup	2,465	64	1,244	53	—11
Total	3,829	100	2,370	100	—
	12 YEARS EDUCATION (RURAL NONFARM)				
	(16)	(17)	(18)	(19)	(20)
Physical Checkup	1,176	42	833	49	+7
No Physical Checkup	1,606	58	875	51	—7
Total	2,782	100	1,708	100	—
	MORE THAN 12 YEARS EDUCATION (FARM)				
	(21)	(22)	(23)	(24)	(25)
Physical Checkup	309	51	249	55	+4
No Physical Checkup	292	49	205	45	—4
Total	601	100	454	100	—
	MORE THAN 12 YEARS EDUCATION (RURAL NONFARM)				
	(26)	(27)	(28)	(29)	(30)
Physical Checkup	393	50	372	66	+16
No Physical Checkup	386	50	194	34	—16
Total	779	100	566	100	—

X^2 for columns (1), (11), (21) = 87.117, d.f. = 2 $P < 0.001$.
X^2 for columns (6), (16), (26) = 45.225, d.f. = 2 $P < 0.001$.
X^2 for columns (3), (13), (23) = 55.804, d.f. = 2 $P < 0.001$.
X^2 for columns (8), (18), (28) = 58.616, d.f. = 2 $P < 0.001$.

tional attainment. In 1972, all educational groups of farm and rural nonfarm had more physical checkups than in 1967. Among these educational groups, the rural nonfarm heads of households with more than 12 years of education made the most significant change during 1967 and 1972, while the farm group with more than 12 years of education made the least change.

In 1967, the members of smaller families (four or less) tended to have more checkups than the members of large families (five or more). In 1972, the same result was obtained. It can be seen in Table 7 that both small families and large families increased in the percentage having physical checkups between 1967 and 1972. Small families made greater gains than large families.

Table 8 gives data on farm and rural nonfarm people with physical checkups by family size. The members of small families who resided on farms showed greater improvement in the percentage of physical checkups between 1967 and 1972 than the small rural nonfarm families. Large rural nonfarm families had more checkups than large rural farm families.

An increasing number of Ohio rural residents are getting physical examinations. However, the 47% reported in 1972 remains below the national level of more than half of the population as reported by Andersen and Anderson (2).

Dental Checkups

Problems of inadequate dental care cut across age and sex groups, perhaps more than most health concerns. Babies often have difficulty in cutting teeth. Youngsters of 6 or 7 experience the loss of teeth as well as decay. These problems continue until a partial or total loss of teeth is suffered at varying ages by most people, causing discomfort as well as aesthetic considerations.

Less significant progress was made in dental checkups than in physical checkups between 1967 and 1972. Table 9 reveals that more rural people had dental checkups in 1972 than in 1967. Yet the change was small. In the 1967 study, there was no significant difference between farm and rural nonfarm people in the number having dental checkups.

TABLE 7.—Number and Percent of Ohio Rural People Who Had Physical Checkups in the Past 2 Years by Family Size, 1967 and 1972.

	1967		1972		Percent Change from 1967 to 1972
	Number	Percent	Number	Percent	
	FOUR OR FEWER FAMILY MEMBERS				
	(1)	(2)	(3)	(4)	(5)
Physical Checkup	2,764	43	2,182	54	+11
No Physical Checkup	3,652	57	1,889	46	—11
Total	6,416	100	4,071	100	—
	FIVE OR MORE FAMILY MEMBERS				
	(6)	(7)	(8)	(9)	(10)
Physical Checkup	2,355	33	1,735	41	+8
No Physical Checkup	4,697	67	2,488	59	—8
Total	7,052	100	4,223	100	—
	TOTAL				
	(11)	(12)	(13)	(14)	(15)
Physical Checkup	5,119	38	3,917	47	+9
No Physical Checkup	8,349	62	4,377	53	—9
Total	13,468	100	8,294	100	—

X^2 for columns (1) and (6) = 133.740, d.f. = 1 $P < 0.001$.
X^2 for columns (3) and (8) = 130.243, d.f. = 1 $P < 0.001$.

TABLE 8.—Number and Percent of Ohio Farm and Rural Nonfarm People Who Had Physical Checkups in the Past 2 Years by Family Size, 1967 and 1972.

	1967		1972		Percent Change from 1967 to 1972
	Number	Percent	Number	Percent	
	FOUR OR FEWER FAMILY MEMBERS (FARM)				
	(1)	(2)	(3)	(4)	(5)
Physical Checkup	1,400	39	1,158	52	+13
No Physical Checkup	2,168	61	1,057	48	—13
Total	3,568	100	2,215	100	—
	FOUR OR FEWER FAMILY MEMBERS (RURAL NONFARM)				
	(6)	(7)	(8)	(9)	(10)
Physical Checkup	1,364	48	1,018	56	+8
No Physical Checkup	1,484	52	809	44	—8
Total	2,848	100	1,827	100	—
	FIVE OR MORE FAMILY MEMBERS (FARM)				
	(11)	(12)	(13)	(14)	(15)
Physical Checkup	1,163	32	897	38	+6
No Physical Checkup	2,532	68	1,487	62	—6
Total	3,695	100	2,384	100	—
	FIVE OR MORE FAMILY MEMBERS (RURAL NONFARM)				
	(16)	(17)	(18)	(19)	(20)
Physical Checkup	1,192	35	836	46	+11
No Physical Checkup	2,165	65	973	54	—11
Total	3,357	100	1,809	100	—

X^2 for columns (1) and (11) = 47.900, d.f. = 1 $P < 0.001$.
X^2 for columns (6) and 16) = 97.470, d.f. = 1 $P < 0.001$.
X^2 for columns (3) and (13) = 120.622, d.f. = 1 $P < 0.001$.
X^2 for columns (8) and (18) = 32.871, d.f. = 1 $P < 0.001$.

TABLE 9.—Number and Percent of Ohio Farm and Rural Nonfarm Residents Who Had Dental Checkups in the Past 2 Years, 1967 and 1972.

	1967		1972		Percent Change from 1967 to 1972
	Number	Percent	Number	Percent	
		FARM			
	(1)	(2)	(3)	(4)	(5)
Dental Checkup	4,029	56	2,701	57	+1
No Dental Checkup	3,234	44	2,028	43	—1
Total	7,263	100	4,729	100	—
		RURAL NONFARM			
	(6)	(7)	(8)	(9)	(10)
Dental Checkup	3,355	54	1,923	54	0
No Dental Checkup	2,850	46	1,639	46	0
Total	6,205	100	3,562	100	—
		TOTAL RURAL			
	(11)	(12)	(13)	(14)	(15)
Dental Checkup	7,384	55	4,624	56	+1
No Dental Checkup	6,084	45	3,667	44	—1
Total	13,468	100	8,291	100	—

X^2 for columns (1) and (6) = 2.662, d.f. = 1 $P > 0.05$.
X^2 for columns (3) and (8) = 98.060, d.f. = 1 $P < 0.001$.

However, in 1972, farm residents exceeded rural nonfarm residents in dental checkups at a statistically significant level.

Males and females differed significantly in dental checkups for both 1967 and 1972 (Table 10). Females exceeded males during both periods. Both groups had a slight increase in dental checkups from 1967 to 1972.

A further examination of male and female participation was made by dividing the respondents into farm and nonfarm categories. Table 11 reveals that farm and rural nonfarm males do not differ significantly in this preventive health measure. However, farm females exceeded rural nonfarm females in dental checkups at a statistically significant level.

In Table 12, the education of the head of the family is examined relative to dental checkups for family members. Differences in educational levels of heads of households were significantly related to the level of participation in dental checkups. As the educational level rose, so did the percentage of dental checkups.

When the 1967 and 1972 data are compared, it can be seen that only the lowest and highest educational groups increased in the percentage of dental checkups between 1967 and 1972. When the edu-

TABLE 10.—Number and Percent of Ohio Rural Males and Females Who Had Dental Checkups in the Past 2 Years, 1967 and 1972.

	1967				1972			
	Male		Female		Male		Female	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dental Checkup	3,636	53	3,748	57	2,286	54	2,443	60
No Dental Checkup	3,286	47	2,798	43	1,909	46	1,653	40
Total	6,922	100	6,546	100	4,195	100	4,096	100

X^2 for columns (1) and (3) = 30.341, d.f. = 1 $P < 0.001$.
X^2 for columns (5) and (7) = 22.432, d.f. = 1 $P < 0.001$.

TABLE 11.—Number and Percent of Ohio Farm and Rural Nonfarm Residents Who Had Dental Checkups in the Past 2 Years by Sex, 1972.

	Farm				Rural Nonfarm			
	Male		Female		Male		Female	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dental Checkup	1,303	55	1,398	62	983	54	1,045	57
No Dental Checkup	1,067	45	856	38	842	46	797	43
Total	2,370	100	2,254	100	1,825	100	1,842	100

X^2 for columns (1) and (3) = 23.598, d.f. = 1 $P < 0.001$.
X^2 for columns (5) and (7) = 3.052, d.f. = 1 $P > 0.001$.
X^2 for columns (1) and (5) = 0.518, d.f. = 1 $P > 0.05$.
X^2 for columns (3) and (7) = 11.790, d.f. = 1 $P < 0.001$.

cational groups are compared with each other, it is shown that the group with a high school education experienced a decline during this 5-year period. However, this group still remains significantly ahead of the lower educated group in the percentage receiving dental checkups.

Table 13 compares farm and rural nonfarm residents when the heads of households have similar educational levels. It reveals that in all educational categories in 1972, the farm respondents reported more dental checkups than nonfarm respondents.

When viewed by changes from 1967 to 1972 with educational achievement controlled, there was a 7% increase in dental checkups of farm residents in the 0 to 11-year educational category, while there was only a 1% change reported for rural nonfarm residents. There was a slight decrease in dental checkups for both farm and rural nonfarm families with 12 years of education. Again, farm people showed a greater increase in dental checkups than rural nonfarm families in the educational category of more than 12 years. Family members of farm heads of households with more than 12 years of education showed the greatest gain in dental checkups between 1967 and 1972.

TABLE 12.—Number and Percent of Ohio Rural Residents Who Had Dental Checkups in the Past 2 Years by Educational Levels of Heads of Households, 1967 and 1972.

	1967		1972		Percent Change from 1967 to 1972
	Number	Percent	Number	Percent	
	0-11 YEARS EDUCATION				
	(1)	(2)	(3)	(4)	(5)
Dental Checkup	2,272	42	1,447	46	+4
No Dental Checkup	3,197	58	1,690	54	—4
Total	5,469	100	3,137	100	—
	12 YEARS EDUCATION				
	(6)	(7)	(8)	(9)	(10)
Dental Checkup	4,047	63	2,508	61	—2
No Dental Checkup	2,376	37	1,572	39	+2
Total	6,423	100	4,080	100	—
	MORE THAN 12 YEARS EDUCATION				
	(11)	(12)	(13)	(14)	(15)
Dental Checkup	1,023	70	759	74	+4
No Dental Checkup	441	30	262	26	—4
Total	1,464	100	1,021	100	—
	TOTAL				
	(16)	(17)	(18)	(19)	(20)
Dental Checkup	7,342	55	4,714	57	+2
No Dental Checkup	6,014	45	3,524	43	—2
Total	13,356	100	8,238*	100	—

X^2 for columns (1), (6), (11) = 697.394, d.f. = 1 $P < 0.01$.
X^2 for columns (3), (8), (13) = 310.052, d.f. = 2 $P < 0.001$.
*Educational information missing for 56 persons.

TABLE 13.—Number and Percent of Ohio Farm and Rural Nonfarm Residents Who Had Dental Checkups in the Past 2 Years by Educational Levels of Heads of Households, 1967 and 1972.

	1967		1972		Percent Change from 1967 to 1972
	Number	Percent	Number	Percent	
	0-11 YEARS EDUCATION (FARM)				
	(1)	(2)	(3)	(4)	(5)
Dental Checkup	1,195	42	868	49	+7
No Dental Checkup	1,678	58	907	51	—7
Total	2,873	100	1,775	100	—
	0-11 YEARS EDUCATION (NONFARM)				
	(6)	(7)	(8)	(9)	(10)
Dental Checkup	1,077	42	579	43	+1
No Dental Checkup	1,519	58	783	57	—1
Total	2,596	100	1,362	100	—
	12 YEARS EDUCATION (FARM)				
	(11)	(12)	(13)	(14)	(15)
Dental Checkup	2,336	64	1,471	62	—2
No Dental Checkup	1,305	36	899	38	+2
Total	3,641	100	2,370	100	—
	12 YEARS EDUCATION (NONFARM)				
	(16)	(17)	(18)	(19)	(20)
Dental Checkup	1,711	62	1,037	61	—1
No Dental Checkup	1,071	38	671	39	+1
Total	2,782	100	1,708	100	—
	MORE THAN 12 YEARS EDUCATION (FARM)				
	(21)	(22)	(23)	(24)	(25)
Dental Checkup	476	70	354	78	+8
No Dental Checkup	209	30	100	22	—8
Total	685	100	454	100	—
	MORE THAN 12 YEARS EDUCATION (NONFARM)				
	(26)	(27)	(28)	(29)	(30)
Dental Checkup	547	70	405	72	+2
No Dental Checkup	232	30	161	28	—2
Total	779	100	566	100	—

X^2 for columns (1), (11), (21) = 389.945, d.f. = 2 $P < 0.001$.
X^2 for columns (6), (16), (26) = 60.162, d.f. = 2 $P < 0.001$.
X^2 for column (3), (13), (23) = 150.755, d.f. = 2 $P < 0.001$.
X^2 for columns (8), (18), (28) = 169.681, d.f. = 2 $P < 0.001$.

When the relationship between family size and dental checkups was examined (Table 14), the findings of 1967 and 1972 differed noticeably. In the 1967 study, large families (five or more members) had a higher percentage of dental checkups than small families (four or less members). In 1972, however, these data revealed little difference in dental checkups based on family size. When the rate of dental checkups between 1967 and 1972 was compared, it was found that members of small families had an increase in dental checkups, while members of large families remained the same.

These data were further delineated into farm and rural nonfarm groups. Findings of both the 1967 and 1972 studies are reported in Table 15. Statistical tests were used to determine the significance of the differences between farm and rural nonfarm people based on family size. In 1967, the difference in dental checkups between farm and rural nonfarm families with four or less members was not significant, while the difference between farm and rural nonfarm families with five or more members was significant. In large families, farm families exceeded rural nonfarm families in the percentage of dental checkups.

The results of the 1972 study were reversed from the 1967 study. There was a significant difference between farm and rural nonfarm families with four or less members, while there was no significant difference among larger families. When the percentages of dental checkups for 1967 and 1972 were compared, it was found that the degrees of improvement from 1967 to 1972 were different relative to both the location of residence and family size among small families. Significant change was made among farm people in small size families in the increased number of dental checkups during the 5-year period, while little change occurred among other family groups.

TABLE 14.—Number and Percent of Ohio Rural Residents Who Had Dental Checkups in the Past 2 Years by Family Size, 1967 and 1972.

	1967		1972		Percent Change from 1967 to 1972
	Number	Percent	Number	Percent	
	FOUR OR FEWER FAMILY MEMBERS				
	(1)	(2)	(3)	(4)	(5)
Dental Checkup	3,292	51	2,289	56	+5
No Dental Checkup	3,125	49	1,782	44	—5
Total	6,417	100	4,071	100	—
	FIVE OR MORE FAMILY MEMBERS				
	(6)	(7)	(8)	(9)	(10)
Dental Checkup	4,092	58	2,440	58	0
No Dental Checkup	2,960	42	1,783	42	0
Total	7,052	100	4,223	100	—
	TOTAL				
	(11)	(12)	(13)	(14)	(15)
Dental Checkup	7,384	55	4,729	57	+2
No Dental Checkup	6,085	45	3,565	43	—2
Total	13,468	100	8,294	100	—

X^2 for columns (1) and (6) = 61.342, d.f. = 1 $P < 0.001$.
X^2 for columns (3) and (8) = 2.037, d.f. = 1 $P > 0.05$.

Chest X-rays and Tuberculin Tests

Chest X-rays are widely used for preventive and diagnostic purposes. Due to the need for specialized equipment for taking X-rays, tuberculin skin tests (TB) are frequently used as a screening procedure. Ohio food handlers are required by law to have a TB

TABLE 15.—Number and Percent of Ohio Farm and Rural Nonfarm Residents Who Had Dental Checkups in the Past 2 Years by Family Size, 1967 and 1972.

	1967		1972		Percent Change from 1967 to 1972
	Number	Percent	Number	Percent	
	FOUR OR FEWER FAMILY MEMBERS (FARM)				
	(1)	(2)	(3)	(4)	(5)
Dental Checkup	1,798	50	1,304	59	+9
No Dental Checkup	1,770	50	911	41	—9
Total	3,568	100	2,215	100	—
	FOUR OR FEWER FAMILY MEMBERS (RURAL NONFARM)				
	(6)	(7)	(8)	(9)	(10)
Dental Checkup	1,494	53	980	54	+1
No Dental Checkup	1,355	47	847	46	—1
Total	2,849	100	1,827	100	—
	FIVE OR MORE FAMILY MEMBERS (FARM)				
	(11)	(12)	(13)	(14)	(15)
Dental Checkup	2,231	60	1,389	58	—2
No Dental Checkup	1,464	40	995	42	+2
Total	3,695	100	2,384	100	—
	FIVE OR MORE FAMILY MEMBERS (RURAL NONFARM)				
	(16)	(17)	(18)	(19)	(20)
Dental Checkup	1,861	55	1,041	58	+3
No Dental Checkup	1,496	45	768	42	—3
Total	3,357	100	1,809	100	—

X^2 for columns (1) and (11) = 73.290, d.f. = 1 $P < 0.01$.
X^2 for columns (6) and (16) = 5.658, d.f. = 1 $P < 0.02$.
X^2 for columns (1) and (6) = 2.587, d.f. = 1 $P > 0.05$.
X^2 for columns (11) and (16) = 17.355, d.f. = 1 $P < 0.01$.
X^2 for columns (3) and (13) = 0.176, d.f. = 1 $P > 0.05$.
X^2 for columns (8) and (18) = 5.616, d.f. = 1 $P < 0.02$.
X^2 for columns (3) and (8) = 11.149, d.f. = 1 $P < 0.001$.
X^2 for columns (13) and (18) = 0.217, d.f. = 1 $P > 0.05$.

test. Chest X-rays for entire families are generally required when a positive reaction occurs from a skin test. First grade children are generally given skin tests in Ohio public schools.

In the 1967 study, respondents were asked if they had either a chest X-ray or a TB skin test. Thirty percent reported they had. The present study asks specifically for each practice and therefore is not directly comparable.

Data in Table 16 reveal 22% of the population had chest X-rays in the past 2 years. There is no significant difference between farm and rural nonfarm residents in the percent who have had chest X-rays. Table 17 notes no difference between males and females in this preventive health practice.

A further examination of the participation pattern of those who have had chest X-rays is shown in Table 18. Members of families where the heads of the households have attained more than 12 years of education had chest X-rays significantly more than members of families where the heads had less education.

To further investigate the role of educational background as an indicator of participation in this health measure, education was examined by controlling for residential location. Table 19 shows that farm families when the head of the household has more than 12 years of education are more likely to have had chest X-rays than any other farm educational category. The pattern for the rural nonfarm family members was not as clear. The family members of the more educated heads had more chest X-rays, but those with 12 years had the least. The reasons for these erratic patterns are not obvious from these data.

These data were also viewed from the perspective of family size. Members of smaller families had chest X-rays significantly more often than members of larger families (Table 20). Further examination of these family size data by residency found no differ-

TABLE 16.—Number and Percent of Ohio Farm and Rural Nonfarm Residents Who Had Chest X-rays in the Past 2 Years, 1972.

	Farm		Rural Nonfarm		Total	
	Number	Percent	Number	Percent	Number	Percent
	(1)	(2)	(3)	(4)	(5)	(6)
Had Chest X-ray	1,011	22	853	23	1,864	22
No Chest X-ray	3,613	78	2,814	77	6,427	78
Total	4,624	100	3,667	100	8,291	100

X^2 for columns (1) and (3) = 2.361, d.f. = 1 $P > 0.05$.

TABLE 17.—Number and Percent of Ohio Rural Residents Who Had Chest X-rays in the Past 2 Years by Sex, 1972.

	Males		Females		Total	
	Number	Percent	Number	Percent	Number	Percent
	(1)	(2)	(3)	(4)	(5)	(6)
Had Chest X-ray	915	22	949	23	1,864	22
No Chest X-ray	3,280	78	3,147	77	6,427	78
Total	4,195	100	4,096	100	8,291	100

X^2 for columns (1) and (3) = 2.191, d.f. = 1 $P > 0.05$.

TABLE 18.—Number and Percent of Ohio Rural Residents Who Had Chest X-rays in the Past 2 Years by Educational Levels of Heads of Households, 1972.

	Educational Level							
	0-11 Years		12 Years		More Than 12 Years		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Had Chest X-ray	703	22	867	21	293	29	1,863	23
No Chest X-ray	2,434	78	3,213	79	728	71	6,375	77
Total	3,137	100	4,080	100	1,021	100	8,238	100

X^2 for columns (1), (3), and (5) = 26.002, d.f. = 2 $P < 0.001$.

ence between small farm and rural nonfarm families relative to those who had chest X-rays, whereas there was a difference among the two groups of larger families (Table 21). Rural nonfarm families of five or more members had more chest X-rays than their farm counterparts. In both cases, small farm and rural nonfarm families exceeded larger families in getting chest X-rays in the past 2 years.

A higher percentage of rural nonfarm family members secured a TB skin test than farm families.

TABLE 19.—Number and Percent of Ohio Farm and Rural Nonfarm Residents Who Had Chest X-rays in the Past 2 Years by Educational Levels of Heads of Households, 1972.

	Educational Level											
	0-11 Years				12 Years				More Than 12 Years			
	Farm		Rural Nonfarm		Farm		Rural Nonfarm		Farm		Rural Nonfarm	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Had Chest X-ray	368	21	335	25	506	21	361	21	136	30	156	28
No Chest X-ray	1,407	79	1,027	75	1,864	79	1,347	79	318	70	410	72
Total	1,775	100	1,362	100	2,370	100	1,708	100	454	100	566	100

X^2 for columns (1) and (3) $= 6.171$, d.f. $= 1$ $P < 0.05$.
X^2 for columns (5) and (7) $= 0.027$, d.f. $= 1$ $P > 0.05$.
X^2 for columns (9) and (11) $= 0.707$, d.f. $= 1$ $P > 0.05$.
X^2 for columns (1), (5), and (9) $= 19.012$, d.f. $= 2$ $P < 0.001$.
X^2 for columns (3), (7), and (11) $= 11.428$, d.f. $= 2$ $P < 0.01$.

TABLE 20.—Number and Percent of Ohio Rural Residents Who Had Chest X-rays in the Past 2 Years by Family Size, 1972.

	Four or Fewer Family Members		Five or More Family Members		Total	
	Number	Percent	Number	Percent	Number	Percent
Had Chest X-ray	1,209	30	656	16	1,865	22
No Chest X-ray	2,862	70	3,567	84	6,429	78
Total	4,071	100	4,223	100	8,294	100

$X^2 = 238.577$, d.f. $= 1$ $P < 0.001$.

TABLE 21.—Number and Percent of Ohio Farm and Rural Nonfarm Residents Who Had Chest X-rays in the Past 2 Years by Family Size, 1972.

	Four or Fewer Family Members				Five or More Family Members			
	Farm		Rural Nonfarm		Farm		Rural Nonfarm	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Had Chest X-ray	668	30	539	30	342	14	313	17
No Chest X-ray	1,547	70	1,288	70	2,042	86	1,496	83
Total	2,215	100	1,827	100	2,384	100	1,809	100

X^2 for columns (1) and (3) $= 0.206$, d.f. $= 1$ $P > 0.05$.
X^2 for columns (5) and (7) $= 6.822$, d.f. $= 1$ $P < 0.01$.
X^2 for columns (1) and (5) $= 167.511$, d.f. $= 1$ $P < 0.001$.
X^2 for columns (3) and (7) $= 75.401$, d.f. $= 1$ $P < 0.001$.

TABLE 22.—Number and Percent of Ohio Farm and Rural Nonfarm Residents Who Had Tuberculin (TB) Skin Tests in the Past 2 Years, 1972.

	Farm		Rural Nonfarm		Total	
	Number	Percent	Number	Percent	Number	Percent
Had TB Skin Test	1,227	27	1,061	29	2,288	28
No TB Skin Test	3,397	73	2,606	71	6,003	72
Total	4,624	100	3,667	100	8,291	100

$X^2 = 5.887$, d.f. $= 1$ $P < 0.05$.

This finding was statistically significant but of low magnitude (Table 22). Viewing the participation in this preventive health practice by sex, it can be noted in Table 23 that females had TB skin tests significantly more than males in the past 2 years.

Controlling these data by the education of the head of the household, it is noteworthy (Table 24) that members of families whose heads have less than a high school education get significantly fewer TB skin tests than those persons from families where the heads have at least a high school education.

Examining these data further, Table 25 reveals that differences in participation in this health measure between farm and rural nonfarm residents are not

TABLE 23.—Number and Percent of Ohio Rural Residents Who Had Tuberculin (TB) Skin Tests in the Past 2 Years by Sex, 1972.

	Males		Females		Total	
	Number	Percent	Number	Percent	Number	Percent
Had TB Skin Test	1,072	26	1,216	30	2,288	28
No TB Skin Test	3,123	74	2,880	70	6,003	72
Total	4,195	100	4,096	100	8,291	100

$X^2 = 17.720$, d.f. $= 1$ $P < 0.001$.

TABLE 24.—Number and Percent of Ohio Rural Residents Who Had Tuberculin (TB) Skin Tests in the Past 2 Years by Educational Levels of Heads of Households, 1972.

	Educational Level							
	0-11 Years		12 Years		More Than 12 Years		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Had TB Skin Test	753	24	1,222	30	302	30	2,277	28
No TB Skin Test	2,384	76	2,858	70	719	70	5,961	72
Total	3,137	100	4,080	100	1,021	100	8,238	100

$X^2 = 33.551$, d.f. $= 2$ $P < 0.001$.

TABLE 25.—Number and Percent of Ohio Farm and Rural Nonfarm Residents Who Had Tuberculin (TB) Skin Tests in the Past 2 Years by Educational Levels of Heads of Households, 1972.

	Educational Level											
	0-11 Years				12 Years				More Than 12 Years			
	Farm		Rural Nonfarm		Farm		Rural Nonfarm		Farm		Rural Nonfarm	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Had TB Skin Test	406	23	347	25	687	29	535	31	129	28	173	31
No TB Skin Test	1,369	77	1,015	75	1,683	71	1,173	69	325	72	393	69
Total	1,775	100	1,362	100	2,370	100	1,708	100	454	100	566	100

X^2 for columns (1) and (3) $= 2.864$, d.f. $= 1$ $P > 0.05$.
X^2 for columns (5) and (7) $= 2.581$, d.f. $= 1$ $P > 0.05$.
X^2 for columns (9) and (11) $= 0.559$, d.f. $= 1$ $P > 0.05$.
X^2 for columns (1), (5), and (9) $= 20.322$, d.f. $= 2$ $P < 0.001$.
X^2 for columns (3), (7), and (11) $= 13.355$, d.f. $= 2$ $P < 0.01$.

TABLE 26.—Number and Percent of Ohio Rural Residents Who Had Tuberculin (TB) Skin Tests in the Past 2 Years by Family Size.

	Four or Fewer Family Members		Five or More Family Members		Total	
	Number	Percent	Number	Percent	Number	Percent
Had TB Skin Test	899	22	1,389	33	2,288	28
No TB Skin Test	3,172	78	2,834	67	6,006	72
Total	4,071	100	4,223	100	8,294	100

$X^2 = 121.215$, d.f. $= 1$ $P < 0.001$.

significant by educational level. However, both farm and rural nonfarm persons in families where the heads attained less than a high school education have a significantly lower participation level in TB skin tests than those families where the heads have more education.

Examining these data by family size (Table 26), it can be noted that families with four or less members have significantly fewer TB skin tests than families with five or more members. Table 27 reveals small families do not differ in TB skin tests when compared by place of residence. However, larger rural nonfarm families have significantly more TB skin tests than farm residents. Both farm and rural nonfarm large families exceeded their small family counterparts in having TB skin tests.

Tetanus Immunization

Tetanus continues to be a formidable disease. The American Medical Association reports that almost half of those infected die (1). Farm people are particularly susceptible since the microorganism responsible for the disease is often found in the soil. Tetanus is most commonly known as lockjaw and is caused by the toxin of the microorganism *Clostridium tetani*. The microorganism is often introduced through wounds.

The 1967 Ohio Rural Health study used a 3-year base to determine the extent of immunization for tetanus (10). This study extended the period to 10 years to conform to current recommendations (9). An article in an American Medical Association newsletter notes: "Immunization with tetanus toxoid every

TABLE 27.—Number and Percent of Ohio Farm and Rural Nonfarm Residents Who Had Tuberculin (TB) Skin Tests by Family Size, 1972.

	Four or Fewer Family Members				Five or More Family Members			
	Farm		Rural Nonfarm		Farm		Rural Nonfarm	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Had TB Skin Test	484	22	409	22	738	31	646	36
No TB Skin Test	1,731	78	1,418	78	1,646	69	1,163	64
Total	2,215	100	1,827	100	2,384	100	1,809	100

X^2 for columns (1) and (3) $= 0.167$, d.f. $= 1$ $P > 0.05$.
X^2 for columns (5) and (7) $= 10.512$, d.f. $= 1$ $P < 0.01$.
X^2 for columns (1) and (5) $= 48.790$, d.f. $= 1$ $P < 0.001$.
X^2 for columns (3) and (7) $= 78.347$, d.f. $= 1$ $P < 0.001$.

TABLE 28.—Number and Percent of Ohio Farm and Rural Nonfarm Residents Who Had Tetanus Shots in the Past 10 Years, 1972.

	Farm		Rural Nonfarm		Total Rural	
	Number	Percent	Number	Percent	Number	Percent
Tetanus Shots	2,634	57	2,070	56	4,704	57
No Tetanus Shots	1,990	43	1,597	44	3,587	43
Total	4,624	100	3,667	100	8,291	100

$X^2 = 0.220$, d.f. $= 1$ $P > 0.05$.

TABLE 29.—Number and Percent of Ohio Farm and Rural Nonfarm Residents Who Had Tetanus Shots in the Past 10 Years by Sex, 1972.

	Farm				Rural Nonfarm			
	Males		Females		Males		Females	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Tetanus Shots	1,481	62	1,153	51	1,118	61	952	52
No Tetanus Shots	889	38	1,101	49	707	39	890	48
Total	2,370	100	2,254	100	1,825	100	1,842	100

X^2 for columns [(1) and (5)] and [(3) and (7)] $= 94.207$, d.f. $= 1$ $P < 0.001$.
X^2 for columns (1) and (3) $= 60.594$, d.f. $= 1$ $P < 0.001$.
X^2 for columns (5) and (7) $= 34.361$, d.f. $= 1$ $P < 0.001$.
X^2 for columns (1) and (5) $= 0.695$, d.f. $= 1$ $P > 0.05$.
X^2 for columns (3) and (7) $= 0.101$, d.f. $= 1$ $P > 0.05$.

10 years, plus possibly a booster when a tetanus-prone injury occurs, provide simple but vital defenses" (1).

Table 28 shows that more than half of Ohio's rural residents have had tetanus shots in the past 10 years. There was no difference between farm and rural nonfarm people in the percent having shots. The 1967 study used a 3-year period as the basis for determining participation in this preventive measure, and consequently revealed a much lower level of participation (28%).

Data in Table 29 reveal that when all males and females are compared relative to the number of tetanus shots they have had, males significantly exceed females in the number receiving shots. When compared by residency location, farm males exceed farm females in tetanus shots. Rural nonfarm males had significantly more tetanus shots in the past 10 years than rural nonfarm females. Holding residency and sex constant, the data were further observed as shown in Table 30. Farm males tend to have more tetanus shots during the production age years, whereas farm females had 44% of their tetanus shots by age 14.

TABLE 30.—Number and Percent of Ohio Farm and Rural Nonfarm Residents Who Had Tetanus Shots in the Past 10 Years by Age and Sex, 1972.

Age	Farm				Rural Nonfarm			
	Males		Females		Males		Females	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
0-4	92	6	83	8	106	10	106	11
5-14	432	29	420	36	372	33	345	36
15-24	366	24	249	21	245	21	194	20
25-44	247	17	193	16	234	20	189	19
45-64	283	19	182	16	128	12	87	10
65 and Over	61	5	26	3	33	4	31	4
Total	1,481	100	1,153	100	1,118	100	952	100

X^2 for columns (1) and (3) = 25.080, d.f. = 11 $P < 0.01$.
X^2 for columns (5) and (7) = 6.338, d.f. = 11 $P > 0.05$.

TABLE 31.—Number and Percent of Ohio Rural Residents Who Had Tetanus Shots in the Past 10 Years by Educational Levels of Heads of Households, 1972.

	Educational Level							
	0-11 Years		12 Years		More Than 12 Years		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Tetanus Shots	1,562	50	2,487	66	633	62	4,682	57
No Tetanus Shots	1,575	50	1,591	34	387	38	3,553	43
Total	3,137	100	4,078	100	1,020	100	8,235	100

X^2 = 103.408, d.f. = 2 $P < .001$.

TABLE 32.—Number and Percent of Ohio Rural Residents Who Had Tetanus Shots in the Past 10 Years by Educational Levels of Heads of Households and Sex, 1972.

	Educational Level											
	0-11 Years				12 Years				More Than 12 Years			
	Males		Females		Males		Females		Males		Females	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Tetanus Shots	864	54	698	45	1,378	67	1,109	55	345	66	289	58
No Tetanus Shots	734	46	841	55	671	33	922	45	176	34	211	42
Total	1,598	100	1,539	100	2,049	100	2,031	100	521	100	500	100

X^2 for columns (1) and (3) = 23.809, d.f. = 1 $P < 0.001$.
X^2 for columns (5) and (7) = 68.566, d.f. = 1 $P < 0.001$.
X^2 for columns (9) and (11) = 7.683, d.f. = 1 $P < 0.01$.
X^2 for columns (1), (5), and (9) = 70.648, d.f. = 2 $P < 0.001$.
X^2 for columns (3), (7), and (11) = 39.051, d.f. = 2 $P < 0.001$.

TABLE 33.—Number and Percent of Ohio Farm and Rural Nonfarm Residents Who Had Tetanus Shots in the Past 10 Years by Family Size, 1972.

	Four or Fewer Family Members				Five or More Family Members			
	Farm		Rural Nonfarm		Farm		Rural Nonfarm	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Tetanus Shots	1,096	49	912	50	1,523	64	1,151	64
No Tetanus Shots	1,119	51	915	50	861	36	658	36
Total	2,215	100	1,827	100	2,384	100	1,809	100

X^2 for columns (1) and (3) = 0.076, d.f. = 1 $P > 0.05$.
X^2 for columns (1) and (5) = 97.157, d.f. = 1 $P < 0.001$.
X^2 for columns (3) and (7) = 69.590, d.f. = 1 $P < 0.001$.
X^2 for columns (5) and (7) = 0.029, d.f. = 1 $P > 0.05$.

Although rural nonfarm males exceed females in the percent of tetanus shots, age is not a factor in determining the difference.

Table 31 discloses that persons with less than a high school education have had significantly fewer tetanus shots in the last 10 years than those with high school or more education. Further examination of these data by sex revealed that males exceeded females at a statistically significant level in all educational categories (Table 32). These data also revealed family size was related to the number having a tetanus shot (Table 33). Families with five or more members had significantly more tetanus shots than smaller families. This relationship held for both farm and rural nonfarm residents. There was no difference between farm and rural nonfarm within small and large families on their participation in this health measure.

TABLE 34.—Number and Percent of Ohio Farm and Rural Nonfarm Residents Who Had Measles Shots, 1967 and 1972.

	1967		1972		Percent Change from 1967 to 1972
	Number	Percent	Number	Percent	
	FARM				
	(1)	(2)	(3)	(4)	(5)
Measles Shots	827	11	1,138	25	+14
No Measles Shots	6,436	89	3,486	75	—14
Total	7,263	100	4,624	100	—
	RURAL NONFARM				
	(6)	(7)	(8)	(9)	(10)
Measles Shots	875	14	1,099	30	+16
No Measles Shots	5,330	86	2,568	70	—16
Total	6,205	100	3,667	100	—
	TOTAL RURAL				
	(11)	(12)	(13)	(14)	(15)
Measles Shots	1,702	13	2,237	27	+14
No Measles Shots	11,766	87	6,054	73	—14
Total	13,468	100	8,291	100	—

X^2 for columns (1) and (6) = 22.420, d.f. = 1 $P < 0.001$.
X^2 for columns (3) and (8) = 30.033, d.f. = 1 $P < 0.001$.

Measles Immunization

Ninety percent of all American adults had the common 10-day measles (rubella) when they were a child (7). Measles are so universal they are not viewed as a dangerous communicable disease. However, 368 persons died from measles or one of its complications in 1963. By 1968, only 24 deaths were reported (8). Measles vaccine has been licensed since 1963 (7). A separate vaccine has been developed for German measles (3-day measles). Thus, information on both types was sought in this study.

This investigation had two major concerns with measles: to learn if progress had been made in immunization of rural people since 1967 and to establish the current level of participation in this preventive health practice.

Twenty-seven percent of Ohio rural residents reported measles shots in 1972 (Table 34). This was a 14% increase over the 1967 study. Rural nonfarm residents exceeded farm residents during both periods. This increase can be explained in part by the change in state regulations which now require school children to have measles shots before entering school.

Data in Table 35 reveal males and females were similar in their participation in this practice. Females showed a greater adoption of measles shots from 1967 to 1972 than males. Females increased their participation by 15% and males increased by 13%.

These data were further viewed by controlling for the educational attainment of heads of households. The relationship was lineal (Table 36). The more educational attainment the head of household had experienced, the greater the likelihood that a family member had had a measles shot.

Family size was also held constant and checked as a further measure of participation in this preventive health practice. It may be noted in Table 37 that families with five or more members experienced a higher level of participation than small families of

four members or less. This finding may be explained in part by the fact that larger families have more children who in turn are more likely than adults to get measles immunization.

Data in Table 38 note a lineal relationship by age categories of rural residents who reported measles shots in 1972. Each age category had fewer measles shots than the previous age group, with 64% of the

TABLE 35.—Number and Percent of Ohio Rural Residents Who Had Measles Shots by Sex, 1967 and 1972.

	1967				1972				Percent Change from 1967 to 1972	
	Males		Females		Males		Females			
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Males	Females
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)		
Measles Shots	934	14	768	12	1,113	27	1,124	27	+13	+15
No Measles Shots	5,988	86	5,778	88	3,082	73	2,972	73	—13	—15
Total	6,922	100	6,546	100	4,195	100	4,096	100	—	—

X^2 for columns (1) and (3) = 9.299, d.f. = 1 $P < 0.01$.
X^2 for columns (5) and (7) = 0.885, d.f. = 1 $P > 0.05$.

TABLE 36.—Number and Percent of Ohio Rural Residents Who Had Measles Shots by Educational Levels of Heads of Households, 1972.

	Educational Level					
	0-11 Years		12 Years		More Than 12 Years	
	Number	Percent	Number	Percent	Number	Percent
Measles Shots	680	22	1,209	30	330	32
No Measles Shots	2,457	78	2,871	70	691	68
Total	3,137	100	4,080	100	1,021	100

$X^2 = 74.221$, d.f. = 1 $P < 0.001$.

TABLE 37.—Number and Percent of Ohio Rural Residents Who Had Measles Shots by Family Size, 1972.

	Four or Fewer Family Members		Five or More Family Members		Total	
	Number	Percent	Number	Percent	Number	Percent
Measles Shots	815	20	1,423	34	2,238	27
No Measles Shots	3,256	80	2,800	66	6,056	73
Total	4,071	100	4,223	100	8,294	100

$X^2 = 196.112$, d.f. = 1 $P < 0.001$.

TABLE 38.—Number and Percent of Ohio Rural Residents Who Had Measles Shots by Age, 1972.

	0-4 Years		5-14 Years		15-24 Years		25 and Over	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Measles Shots	369	64	1,189	61	407	26	272	6
No Measles Shots	210	36	772	39	1,136	74	3,936	94
Total	579	100	1,961	100	1,543	100	4,208	100

$X^2 = 2427.649$, d.f. = 7, $P < 0.001$.

TABLE 39.—Number and Percent of Ohio Farm and Rural Nonfarm Residents Who Had German Measles Shots, 1972.

	Farm		Rural Nonfarm		Total	
	Number	Percent	Number	Percent	Number	Percent
German Measles Shots	871	19	853	23	1,724	21
No German Measles Shots	3,753	81	2,814	77	6,567	79
Total	4,624	100	3,667	100	8,291	100

$X^2 = 24.045$, d.f. = 1 $P < 0.001$.

0 to 4 age group experiencing the highest level of participation. This was expected as measles is generally viewed as a childhood disease. In addition, the Ohio Department of Health has conducted a special measles campaign to encourage parents to get their children vaccinated.

Table 39 shows that rural nonfarm family members exceed farm residents in the percent who have had German measles shots. As expected, rural people have fewer German measles shots than 10-day type measles shots.

SUMMARY AND CONCLUSIONS

Four general objectives were investigated in this research. The first was to measure the level of participation in selected health practices by Ohio's rural residents. A second objective was concerned with the determination of changes in participation in selected health practices from 1962 through 1972. A third objective was to compare the level of participation in selected health practices by farm and rural nonfarm residents. The fourth objective was to examine the levels of participation in selected health practices by age, sex, educational attainment, and family size.

Findings are summarized in Tables 40 and 41. The percentage of rural Ohio residents who had physical checkups in the past 2 years increased 9% between 1967 and 1972. Problems of dental care are related to age and sex more than most health concerns. Fifty-six percent of the rural residents had a dental checkup in the past 2 years. Dental checkups increased only 1% between 1967 and 1972. In the past 2 years, only 22% of the rural residents had a chest X-ray and only 28% had a tuberculin skin test in 1972. These findings reflect that rural people are not taking advantage of services available to them.

Tetanus immunizations are important to rural people who are exposed to the microorganisms. Tetanus organisms enter the body through wounds or openings in the skin. Fifty-seven percent of the rural residents had a tetanus shot in the past 10 years. The study revealed that less than 25% of the youth (ages 15-24) had a tetanus shot in the past 10 years. Since this is a free service to school children in 6th grade, the level of immunization was expected to be much higher.

Among the seven preventive health measures studied, immunization for measles made the most significant progress between 1967 and 1972. The data showed that 27% of the rural people reported measles shots in 1972. This was an increase of 14% over the 1967 study. Rural people responded favorably to a national campaign to eradicate this serious disease. Sixty-four percent of the children (ages 0 to 4) had received measles immunizations. This fact indicates that the campaign to immunize children is working.

Higher education level of the household head and larger family size had positive effects on participation levels. Sex and age had lesser effects on participation levels in selected health practices. In general, rural people of Ohio are paying more attention to their health than before.

The foregoing presentation of data and findings noted the levels of participation in preventive health practices among farm and rural nonfarm residents of Ohio. The following conclusions are based on these findings.

TABLE 41.—Summary of the Significance of Selected Factors in Identifying Participation Levels in Selected Health Practices by Ohio Rural Residents, 1972.

Health Practices	Age	Sex	Education	Family Size
Physical Checkups	+	—	+	+
Dental Checkups		+	+	—
Chest X-rays		—	+	+
Tuberculin (TB) Skin Test		+	+	+
Tetanus Immunization	—	+	+	+
Measles Immunization	+	—	+	+

+ mark = a significant factor.
— mark = a nonsignificant factor.

TABLE 40.—Comparison of Levels of Participation in Selected Health Practices by Ohio Farm and Rural Nonfarm Residents, 1967 and 1972.

Health Practices	1967 (Percent)	1972 (Percent)	Percent Change from 1967 to 1972	Farm (Percent)	Rural Nonfarm (Percent)
Physical Checkups	38	47	+ 9	45	51
Dental Checkups	55	57	+ 2	57	54
Chest X-rays	*	22	—	22	23
Tuberculin (TB) Skin Test	*	28	—	27	29
Tetanus Immunization	*	57	—	57	56
Measles Immunization	13	27	+14	25	30
German Measles Immunization	*	21	—	19	23

*No comparable data.

- Rural nonfarm people tend to participate more extensively in preventive health practices than farm residents. This conclusion is supported by the fact that rural nonfarm people participated in five of the seven selected health practices at a higher rate than rural farm people. It should be noted, however, that the gap is rapidly closing and farm people now exceed rural nonfarm residents in dental checkups and tetanus immunization.
- Age is a factor in predicting preventive health behavior. It is related to a specific practice under certain circumstances. For example, older people are more likely to get physical examinations, whereas the younger are more likely to get measles shots. This does not hold true for tetanus immunization. The 5 to 24 age group was reported to have the highest percentage of rural people who had a tetanus shot in the past 10 years. It is noted that preventive health practices such as measles shots, tetanus shots, and immunization for other children's diseases should be the highest because they are required by law for school children and doctors encourage parents to protect their children.
- In specific practices, sex is a predictor of the level of participation in preventive health. Males and females do not differ in the number of physical checkups, chest X-rays, or measles immunizations. However, females exceed males in the percentages of dental checkups and TB skin tests. Males exceed females in the number of tetanus immunizations. It can be concluded that the sex of an individual generally has little effect on the level of participation in preventive health practices. Rural nonfarm people exceeded rural people in five out of the seven selected health practices.
- The higher the educational attainment of the household head, the higher the participation in preventive health measures. This generalization held for all health practices investigated in this study. It was also supported in the 1967 study. Educational level of head of household was highly correlated with the seven selected health practices. Educational level is a major factor in predicting the level of participation in health practices.
- Family size tends to be a factor in predicting the level of participation in preventive health practices. However, as with age, it is health practice specific. Smaller families participated more frequently in such practices as physical checkups and X-rays, while large families participated more often in immunizations. It was interesting to note that family size was significant in all seven selected health practices except dental checkups.

These conclusions highlight the findings of this research project. Examination of data revealed in this longitudinal study should be beneficial to those engaged in designing and executing programs. It depicts the need to increase the participation level of rural Ohioans in preventive health measures. It is apparent that factors such as place of residence, educational attainment of head of household, age, sex, and family size can provide additional information when attempting to predict the preventive health practices of rural residents in Ohio. Individuals who are rural farm, low educated, younger, and from smaller families tend to have the greatest need for preventive health practices. Therefore, additional educational efforts should be directed to these people.

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